Appendix OO –
Life Cycle Cost Analysis for Pavements

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Performing Life Cycle Cost Analysis

The policies and procedures for life cycle cost analysis are discussed in Chapter 8, 9, and 10 of this manual. The *Life Cycle Cost Analysis Procedures Manual* and *Highway Design Manual Topics 619* and *612* provide the information and procedures needed for when and how to complete a life cycle cost analysis for pavements.

Documenting Life Cycle Costs

This appendix provides a format for how to document the life cycle cost analysis results into project initiation documents (PIDs) and project reports. Each alternative that was analyzed for the project should be listed on the form. Alternative 1 should be listed on the form and identified as follows:

- For PIDs, identify the pavement alternative-identified-to program-project-cost.
- For project reports, identify the preferred alternative selected for project approval.

Typically three to four alternatives (but no less than two alternatives) will be analyzed at both the project initiation phase and project report phase. The cost data shown on this form should be consistent with the input and output data from the Department approved version of *RealCost* software.

The data should be input as follows:

Alternative Description:

Describe the pavement alternative being analyzed. Include the pavement structure (thicknesses and types of the various layers of the pavement) and any other features unique to this alternative.

Pavement Design Life:

Input the pavement design life of the alternative. For more information on pavement design life, see *Highway Design Manual Topic 612*.

Initial Construction Costs:

For Alternative 1, these are the same as the project estimates developed for programming/constructing the project. For the rest of the alternatives, the initial construction costs are developed to the same level of detail used to develop the project estimate for Alternative 1. Note that changes in pavement type and thickness will also result in changes to non-pavement items of work such as but not limited to earthwork, traffic control, supplemental work, and contingencies.

Initial Project Support Costs:

These are the costs (in personnel service dollars) for all of the support costs needed to complete environmental studies, design, construction, right of way, project management, and other associated items. Typically the initial project support costs will be the same for each alternative unless the alternative requires additional time to environmentally clear, design, or construct. If a different project support estimate is needed, it should be developed to the same level of detail as Alternative 1.

Note that the *RealCost* program includes initial project support costs with initial construction costs.

Future Maintenance and Rehabilitation Costs:

These costs are derived from the tables and figures found in the *Life Cycle Cost Analysis Procedures Manual*. These are one of the outputs of the *RealCost* software.

Total Agency Costs:

This is the sum of initial construction costs, project support costs, and future maintenance and rehabilitation costs.

User Costs:

User costs include travel time costs, vehicle operating costs, and crash costs incurred by the traveling public. Such user costs typically arise when work zones are imposed for field work which restricts the normal capacity of the facility and reduces traffic flow. These costs are calculated and reported by the *RealCost* software approved by the Department using data from the *Life Cycle Cost Analysis Procedures Manual.*

Total Life Cycle Costs:

This is the sum of total agency costs and user costs.

Reason that this is not Alternative 1:

For all alternatives, except Alternative 1, state the reason why it was not Alternative 1. Note that except for pavement design life requirements found in *Highway Design Manual* *Topic 612*, there is no requirement that the lowest life cycle cost alternative must be Alternative 1. However, if the lowest life cycle cost alternative is not the identified Alternative 1, it should be honestly and accurately stated why on the form.

Transmittal of Life Cycle Costs Information

A copy of the completed project initiation document, project report, or project scope summary report with the life-cycle costs included shall be sent to:

ATTN:

Life-Cycle Cost Analysis Coordinator
Office of Pavement Design, Division of Design
California Department of Transportation
Transportation Laboratory—MS 5
5900 Folsom Boulevard, Room Q1-39
Sacramento, CA 95819-4612

Life Cycle Cost Analysis Form

Alternative 1 (Pavement-alternative-identified-to-program-project cost *or* Preferred Alternative) *Delete either "Pavement-alternative-identified-to-program-project cost" "or "Preferred Alternative" as appropriate for project milestone.*
Briefly describe the pavement strategy and other unique features

_____

Pavement Design Life: _____ Years		
Initial Construction Costs:	$ _____	
Initial Project Support Costs:	$ _____	
Future Maintenance & Rehabilitation Costs:**	$ _____	
TOTAL AGENCY COSTS:		$ _____
USER COSTS:		$ _____
TOTAL LIFE-CYCLE COSTS:		$ _____

Alternative 2:*
Briefly describe the pavement strategy and differences in scope from Alternative 1.

_____

Pavement Design Life: _____ Years		
	$ _____	
Initial Project Support Costs:	$ _____	
Future Maintenance & Rehabilitation Costs:**	$ _____	
TOTAL AGENCY COSTS:		$ _____
USER COSTS:		$ _____
TOTAL LIFE-CYCLE COSTS:		$ _____

Reason that this is not Alternative 1:

_____

* Repeat as often as needed, with appropriate numbering, to cover all pavement alternatives investigated.

****** Includes both future maintenance, construction, and project support costs.